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The International Bureau of WIPO
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"Amendment of the claims under Article 19(1) (Rule 46)"

Re: International Application No. PCT/JP2004/015847
International Filing Date: 26 October 2004
Applicant: Air Operation Technologies Inc.
Agent: IKEUCHI SATO & PARTNER PATENT ATTORNEYS
Our Ref.: H2404-01

Dear Sir:

The Applicant, who received the International Search Report relating to the above-identified International Application transmitted on 22 March 2005, hereby files amendment under Article 19(1) as in the attached sheets.

We hereby would like to amend the claims 1-4, and also add the claims 11 and 12. The claims 5-10 are retained unchanged.

The Applicant also files as attached herewith a brief statement explaining the amendment and indicating any impact the amendment might have on the description or the drawings.

Sincerely yours,



IKEUCHI SATO & PARTNER PATENT ATTORNEYS
Representative Partner
Hiroyuki IKEUCHI

Attachment:

(1) Amendment under Article 19(1)	2 sheets
(2) Brief Statement	1 sheet

CLAIMS

[1] (Amended) A cooling device comprising a cooler provided in an interior that is insulated adiabatically from an exterior, a cooling fan disposed on a front surface of the cooler, and a cooling chamber that is defined by a space in front of the cooling fan and in which an object to be cooled is placed, the cooling device drawing cooled air behind the cooling fan with the fan and allowing the cooled air to flow into the cooling chamber,

wherein $a/D = 1/2$ to $1/4$ is satisfied, where a indicates a dimension of a gap between the cooler and the cooling fan along a front-back direction and D indicates a diameter of the cooling fan,

a dimension of a gap between the cooler and a wall surface on a back surface side of the cooler is set to be larger than 50 mm, and

a pressure at a point located 100 mm forward of a point of rotational center of the cooling fan is allowed to oscillate or pulse by adjusting a number of revolutions of the cooling fan.

[2] (Amended) The cooling device according to claim 1, wherein an average pressure at the point located 100 mm forward ranges from 10 gf/cm² to 28 gf/cm².

[3] (Amended) The cooling device according to claim 1 or 2, wherein the number of revolutions of the cooling fan is adjusted so that resonance occurs in the pressure oscillation or pressure pulsation when the dimension a is varied.

[4] (Amended) The cooling device according to claim 1, wherein a lateral surface of the cooler is covered with a control plate so as to prevent substantially air from moving in and out through the lateral surface of the cooler.

[5] The cooling device according to any one of claims 1 to 4, wherein a number of revolutions of the cooling fan is adjustable.

[6] The cooling device according to claim 5, wherein the number of revolutions is 1200 to 2100 rpm.

[7] The cooling device according to any one of claims 1 to 6, wherein a vibration driving portion for vibrating a placement stage on which the object to be cooled is placed is provided in the cooling chamber.

5 [8] The cooling device according to any one of claims 1 to 7, wherein the coolers are provided so as to face each other with the cooling chamber interposed therebetween, and the cooling fans provided respectively on the front surfaces of the facing coolers are offset so as not to face each other.

10 [9] The cooling device according to any one of claims 1 to 8, wherein a number of the cooling fans provided on the front surface of the cooler is more than one, and when the front surface of the cooler is divided virtually into a plurality of blocks, the cooling fans are arranged on the front surface corresponding to blocks selected in a staggered manner.

15 [10] The cooling device according to any one of claims 1 to 9, wherein a rotation of the cooling fan is set to be counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

[11] (Added) The cooling device according to any one of claims 1 to 10, wherein both of a maximal value of a frequency (Hz) of the pressure oscillation or pressure pulsation and a maximal value of an amplitude relative to pressure (T/P_{ave}) are present in a vicinity of $a/D = 1/4$.

20 [12] (Added) The cooling device according to any one of claims 1 to 11, wherein the cooling device is a sealed interior cooling device, a spiral freezer cooling device provided with a conveyor for conveying the object to be cooled spirally or a tunnel freezer cooling device provided with a conveyor for conveying the object to be cooled horizontally.

Statement under PCT Article 19 (1) (PCT Rule 46.4)**1. Explanation of amendments**

The amended portions in the amended claim 1 are based on claim 3, paragraphs [0025] to [0027], [0033] to [0034] and FIGs. 8 to 9 in the application as originally filed.

The amended claim 2 is based on paragraph [0026], lines 7 to 8 in the application as originally filed. The amended claim 3 is based on paragraph [0027], lines 16 to 19 and FIG. 5 in the application as originally filed. In the amended claim 4, the claim from which it depends is changed.

The added claim 11 is based on paragraphs [0027] to [0028] and FIGs. 5 to 6 in the application as originally filed. The added claim 12 is based on paragraph [0039] in the application as originally filed.

2. Comparison between the present invention and cited documents

Cited documents 1 to 2 neither describes nor suggests the configuration " $a/D = 1/2$ to $1/4$ is set, where a indicates a dimension of a gap between the cooler and the cooling fan along a front-back direction and D indicates a diameter of the cooling fan, a dimension of a gap between the cooler and a wall surface on a back surface side of the cooler is set to be larger than 50 mm, and a pressure at a point located 100 mm forward of a point of rotational center of the cooling fan is allowed to oscillate or pulse by adjusting a number of revolutions of the cooling fan", which is a characteristic requirement of the invention of the present application.

Owing to this difference in configuration, the invention of the present application can achieve the special effects described in paragraphs [0013], [0024], [0026] to [0027], [0029], [0033] to [0034].

Thus, we believe that the invention of the present application cannot be made easily from cited document 1.

Further, we believe that the invention of the present application has an industrial applicability.